

# Usefulness of Didactic Strategies in Teaching High School Mathematics

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## Abstract

The lack of implementation of the strategies by the teacher in the classroom is reflected in the poor performance of the students, which discourages them, losing interest in learning Mathematics. Demotivation is one of the main problems presented in the teaching-learning process of Mathematics. This led us to carry out this research with the purpose of showing the usefulness of the application by the teacher of the didactic strategies, so that the students are motivated in the learning of high school mathematics. In this research, two groups of the Mathematics III course, at Baccalaureate level, were considered, one where the teacher uses teaching-learning strategies and another where he does not apply some teaching-learning strategy. A questionnaire was applied to both groups, at the end of the course, to detect the usefulness of the application of didactic strategies. The results are presented in two tables. The results are compared and for last it is concluded that the didactic strategies in the classroom are useful to motivate the students in the learning of the Mathematics of High School and consequently they allow to avoid the high rates of reprobation and the desertion in this subject.

**Keywords:** Strategies of teaching-learning; didactic strategies; utility of didactic strategies.

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## **1. Introduction**

Several teaching strategies are currently used for the teaching of high school mathematics, these can be of two types:

- Those of spontaneous teacher thinking, subject to their own evidences.
- Innovation proposals.

The didactic strategies most used in the process of Mathematics teaching-learning have been until now:

- The transmission-reception of knowledge.
- Problem solving.
- The use of computers and new technologies in teaching.
- Constructivist proposals (considering the competence of the students).
- Ludic strategies.

These strategies are characterized by considering some important aspects in the learning of the concepts of Mathematics, by the students, but neglect others. This leads us to ask, whether it is possible that the application of teaching strategies by the teacher would be useful for students to be motivated in the learning of High School Mathematics? In the first instance, we can answer, yes.

According to the results of this research, it was possible to establish that several didactic strategies should be applied in the development of the course to be successful in the teaching-learning process.

The didactic strategies, such as the constructivists in [1], applied in the classroom by the teacher of Mathematics of High School, give an open margin to more possibilities, as the role that the student assumes as the center of the teaching-learning process, who adopts, constructs and reconstructs knowledge through operations, class activities and extra-class.

In this teaching-learning process, mediators are teachers, who play an important role, because they are instruments that transform the student's reality, promoting object-subject and subject-subject interaction, so that knowledge of The Mathematics of High School.

It is a great challenge for the teacher to implement strategies or didactic proposals, for all the activities that have to be carried out in each heterogeneous group of students [2], an alternative for the teacher is to apply ludic strategies, as referred in [3] And another author in [4], refers that it is necessary to apply strategies where the tools of new technologies are used, so that the teaching-learning process is beneficial in the study of Mathematics. Several authors, such as [5, 6], consider the teaching-learning strategy called problem solving, considering it as a useful strategy in teaching Mathematics.

In other research [7, 8], it is considered useful the ludic strategies and the consideration of the learning styles of each student, to solve the problem of learning math.

Another author in [9], considers the didactic strategy of cooperative learning applied in the teaching-learning process of Mathematics to be very useful. On the other hand, although the didactic strategies are useful, most of the teachers in service think that, they are unable to apply several strategies in the Mathematics course, due to the reduced time allocated for the teaching of this course, so the results are not what they want.

## **2. Materials and Methods**

This research is of the qualitative type, because we have only considered the percentages of the students who answered the 12 questions of a questionnaire, without doing a complex statistical analysis, to detect the utility of didactic strategies.

The research was carried out in the classroom with a group A, where the teacher does apply some didactic strategies and another group B, in which there is no evidence that a didactic strategy is applied, a questionnaire was applied on the application of didactic strategies in the course and a problem of Mathematics of High School, in both groups at the end of the course.

The information was concentrated in two tables, considering the percentages of the students who answered affirmatively and negatively to the questions, to detect the utility of the didactic strategies to motivate the students in the learning of the Mathematics of High School, as well as to establish its importance in the teaching-learning process to avoid dropout and high failure rate in this course.

### **2.1 Interview in the classroom**

A questionnaire of 12 questions and a problem was applied to the students of group A and B of Mathematics of High School, about the use of didactic strategies, for the motivation and achievement of the objectives of learning of the course of Mathematics III.

The percentage of the answers were concentrated in two tables, to determine the usefulness of the didactic strategies both for the motivation of the students to learn Mathematics and for the teaching-learning process in this course to be successful.

## **3. Results**

The results obtained are presented in the following tables:

Observations:

- 100% of the students in group A solved the problem.
- 80% of the students in group A solved it correctly.
- The teacher applies several strategies in group A.

**Table 1:** Shows the percentage of students group who answered the questions.

Questions	Yes	No
1. Do you like Mathematics?	55%	45%
2. Was it easy for you to learn mathematical concepts previously?	35%	65%
3. Have you failed Mathematics because you have not been motivated to learn?	20%	80%
4. Have you deserted a Mathematics course because the teacher does not apply appropriate teaching strategies to motivate you in the learning of the course?	30%	70%
5. Do you consider that it is necessary for the teacher to apply some didactic strategy to motivate the students in the learning of Mathematics?	70%	30%
6. Does your teacher consider the collaborative work of the students to evaluate their learning of Mathematics?	40%	60%
7. Does your teacher consider problem solving as part of the Mathematics course assessment?	60%	40%
8. Does your teacher use the new technologies in the development of the Mathematics course?	40%	60%
9. Do you carry out ludic activities in the Mathematics course?	20%	80%
10. Does your teacher consider your learning styles in the Mathematics course?	40%	60%
11. Have you noticed that your teacher has implemented constructivist teaching-learning strategies in the development of the course, which have been useful in the learning of Mathematics?	80%	20%
12. Do you consider that you learn better and more easily the concepts of Mathematics when your teacher applies some teaching-learning strategies in the course development?	90%	10%

**Table 2:** Shows the percentage of group B students who answered

Questions	Yes	No
1. Do you like Mathematics?	10%	90%
2. Did you find it easy to learn the concepts of Mathematics previously?	30%	70%
3. Have you failed Mathematics because you have not been motivated to learn?	65%	35%
4. Have you deserted the Mathematics course because the teacher does not apply adequate didactic strategies to motivate you in the learning this course?	60%	40%
5. Do you consider that it is necessary for the teacher to apply some didactic strategy to motivate you in the learning of Mathematics?	80%	20%
6. Does your teacher consider the collaborative work of the students to evaluate their learning of Mathematics?	0%	100%
7. Does your teacher consider problem solving as part of the assessment of the Mathematics course?	20%	80%
8. Does your teacher use the new technologies in the development of the Mathematics course?	0%	100%
9. Do you carry out ludic activities?	0%	100%
10. Does your teacher consider your learning styles in the math course?	0%	100%
11. Have you noticed that your teacher has implemented constructivist teaching-learning strategies in the development of the course, which have been useful in the learning of Mathematics?	0%	100%
12. Do you think that you would learn better and more easily the concepts of Mathematics if your teacher applied a teaching-learning strategy in the course development?	85%	15%

Observations:

- 70% of the students in group B solved the problem.
- 40% of the students in group B solved it correctly.
- It is not possible to establish precisely if the teacher in group B applies a strategy.

#### **4. Discussion**

There is a great difference between our research and that of other authors [1,2], [3,4], [5,7] and [9] that deal with the same issue, is that they only do their research for a strategy in particular and at the basic level or at the higher level without considering the motivation in the students to learn mathematics, instead we consider the utility of didactic strategies, in general, from the perspective of the students of Baccalaureate level, so that The teachers take this into account, and use them in the classroom, to motivate students in the learning of mathematics.

The results presented in Table 1 and 2 of the questions asked about the use of didactic strategies show that:

- The pleasantness for Mathematics is greater in group A than in B.
- In both groups, it was difficult for them to learn the concepts of Mathematics in previous courses
- The percentage of students, who have failed Math because they have not motivated them for learning, is higher in group B than in A.
- The percentage of students who have dropped out of the Mathematics course because the teacher does not apply an adequate didactic strategy to motivate them in the learning of this course is greater in group B than in A.
- Most of the students in both groups consider that it is necessary to apply didactic strategies to motivate them to learn mathematics.
- In group A, the teacher considers a percentage of the students' collaborative work to evaluate their learning of Mathematics and group B is not considered.
- In both groups, the teacher considers problem solving as part of the assessment of the Mathematics course. But in group A, there is a higher percentage of students who answered affirmatively.
- In group A, the teacher uses the new technologies, in the development of the Mathematics course and in the B no.
- Group A does not carry out ludic activities in Mathematics and B does not.
- In group A, the teacher considers their learning styles in the Mathematics course and in group B are not considered.
- It was observed, that the teacher has applied constructivist teaching-learning strategies in the development of the course, which have been useful in the learning of mathematics.
- In group A, the student is aware of the usefulness of the constructivist teaching-learning strategies that the teacher applies in the development of the Mathematics course and in group B, there is no evidence of the usefulness of these teaching- learning.
- Most of the students, in both groups, consider that the application of didactic strategies in the development of the Mathematics course, would be useful to motivate them in the learning of

Mathematics.

- All students in group A solved the problem, not the students in group B.
- A higher percentage of students in group A compared to students in group B solved the problem correctly.

## **5. Conclusions**

According to the results of this research with the two groups A and B, it was possible to detect that the didactic strategies are very useful, to motivate the students to learn the Mathematics of High School.

Consequently, it can be said that the application of didactic strategies in the classroom promotes the learning of significant knowledge with greater ease for the student of Mathematics of High School.

Therefore, we can infer, that the rate of failure and avoidance of dropout in this course could be reduced, using several didactic strategies in the classroom.

This is of great importance since Mathematics is the fundamental tool for the study of other sciences, if the student is motivated to learn his concepts, this will allow him to have the formation and development of his theoretical thought, which is the basis for the construction of scientific concepts.

Therefore, it can be said that the teacher, even with the short time allocated to the course of Mathematics of High School, should always apply at least one didactic strategy in the course development, because they are useful to achieve the learning in the students who study the Mathematics course.

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